Misc. Publication A36.

THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

ADMINISTRATIVE REPORT

(FORTIETH YEAR)

GENERAL DEVELOPMENT AND ACTIVITIES

EAST MALLING RESEARCH STATION

Near MAIDSTONE

KENT

1st October, 1951, to 30th September, 1952

Published April, 1953.

COMMONWEALTH MYCOLOGICAL INSTITUTE
29 MAY 1953

GOVERNING MEMBERS OF THE SOCIETY

Appointed by the Ministry of Agriculture:

Dr. H. V. Taylor, A.R.C.S., V.M.H., C.B.E., Preston Grange, Barnet Road, Potters Bar, Middlesex.

Appointed by the Kent County Council:

Sir Edward Hardy, Boughton Court, Ashford, Kent.

T. E. Wimshurst, Esq., Tibbs Court, Brenchley, Kent.

Major A. R. Pym, Barnfield, Charing, Ashford, Kent.

Appointed by the Surrey County Council:

T. Hilling, Esq., Prestons, Chobham, Surrey.

Appointed by the East Sussex County Council:

D. Curzon Lewis, Esq., High Weald Farms, Boarshead, Crowborough, East Sussex.

Appointed by the West Sussex County Council:

W. Fowle, Esq., Costrong Farm, Kirdford, near Billingshurst, Sussex.

Appointed by the Council of the Senate of the University of Cambridge:

Professor F. T. Brooks, C.B.E., M.A., F.R.S., 31 Tenison Avenue, Cambridge. (*Deceased March*, 1952.)

Professor G. E. Briggs, M.A., F.R.S., University of Cambridge, Botany School, Downing Street, Cambridge. (*Appointed June*, 1952.)

Appointed by the Senate of the University of London:

Professor Wm. Brown, M.A., D.Sc., F.R.S., Imperial College of Science and Technology, South Kensington, London, S.W.7.

Appointed by the University of Bristol:

Professor T. Wallace, C.B.E., M.C., D.Sc., F.R.I.C., V.M.H., The Research Station, Long Ashton, near Bristol.

Appointed by the Governing Body of the Imperial College of Science and Technology:

Professor V. H. Blackman, Sc.D., F.R.S., 17 Berkeley Place, Wimbledon, London, S.W.19.

Appointed by the Council of the Royal Society:

Professor E. J. Maskell, F.R.S., Botanical Department, The University, Edgbaston, Birmingham, 15.

Appointed by the Governors of Wye College, Kent:

B. S. FURNEAUX, Esq., M.Sc., 94 Warwick Park, Tunbridge Wells, Kent.
D. SKILBECK, Esq., M.A., Wye College, Wye, Kent.

Appointed by the Research and Advisory Committee of Wye College, Kent:

Professor H. W. MILES, D.Sc., Ph.D., Wye College, Wye, Kent.

Appointed by the Council of John Innes Horticultural Institution:

M. B. CRANE, Esq., V.M.H., F.R.S., John Innes Horticultural Institution, Bayfordbury, Hertford, Herts.

Appointed by the Council of the Royal Horticultural Society:

F. A. SECRETT, Esq., C.B.E., F.L.S., V.M.H., Hurst Farm, Milford, near Godalming, Surrey.

Appointed by the Council of the Institute of Brewing:

M. V. COURAGE, Esq., Anchor Brewhouse, Horselydown, London. S.E.1.

Appointed by the Research Fund Committee of the Institute of Brewing:

G. T. COOK, Esq., Lulworth, Queen's Avenue, Maidstone, Kent.

Appointed by the National Farmers' Union (Central Council, London):

G. E. TUKER, Esq., Thorn Cottage, Danbury, Essex.
H. A. HAILE, Esq., The Mount, Norwich Road, Wisbech, Cambs.

Appointed by the National Farmers' Union (Kent Branch):

W. ALEXANDER, Esq., M.B.E., Home Farm, Eynsford, Kent.
ALFRED DAY, Esq., O.B.E., J.P., St. Aubyns, Sutton Valence, Kent.
S. R. DIXON, Esq., J.P., Cambridge, Teynham, Sittingbourne, Kent.
W. TALBOT EDMONDS, Esq., Allington Farm, Maidstone, Kent.
E. BRUCE GIBSON, Esq., Lumbersland, Birchwood, Wilmington, Dartford, Kent.
C. T. MILLER, Esq., Wested Farm, Swanley, Kent.
D. J. MOOR, Esq., Nichol Farm, Teynham, Sittingbourne, Kent.
J. W. S. MOUNT, Esq., Little Barton, Canterbury, Kent.
T. NEAME, Esq., Macknade, Faversham, Kent.
C. L. NEWITT, Esq., Cuckoo Orchard, Hartlip, Sittingbourne, Kent.
J. F. TOWNER, Esq., Salts Farm, Loose, near Maidstone, Kent.
R. D. WICKHAM, Esq., Gate House Farm, Brenchley, Kent.

Appointed by the Council of the Horticultural Trades' Association:

L. J. COOK, Esq., A.H.R.H.S., Dingleden, 7 Drapers Road, Enfield, Middlesex.

Appointed by the East Malling Research Station Association:

W. P. SEABROOK, Esq., St. Barnabas, Frinton-on-Sea, Essex.

A. M. BEAR, Esq., Tendring, Magham Down, Hailsham, Sussex.

Appointed by East Malling Research Station:

F. R. TUBBS, Esq., M.Sc., Ph.D.(Lond.), A.R.C.S., D.I.C., F.L.S.

Appointed by the Staff Council of East Malling Research Station:

R. J. GARNER, Esq., M.Sc., N.D.H., Dip.Hort.(Reading).

MEMBERS OF THE EXECUTIVE COMMITTEE

(Governing Members elected at the General Meeting, June, 1951)

Professor V. H. BLACKMAN, Sc.D., F.R.S. (Vice-Chairman).

Professor F. T. BROOKS, C.B.E., M.A., F.R.S. (*Deceased March*, 1952.)

Professor WM. BROWN, D.Sc., F.R.S.

G. T. COOK, Esq.

L. J. COOK, Esq., A.H.R.H.S.

M. B. CRANE, Esq., V.M.H., F.R.S.

ALFRED DAY, Esq., O.B.E., J.P.

S. R. DIXON, Esq., J.P.

W. TALBOT EDMONDS, Esq.

W. FOWLE, Esq.

B. S. FURNEAUX, Esq., M.Sc.

H. A. HAILE, Esq.

Sir EDWARD HARDY.

Professor E. J. MASKELL, F.R.S. (*Appointed June*, 1952.)

J. W. S. MOUNT, Esq.

T. NEAME, Esq. (Chairman).

W. P. SEABROOK, Esq.

J. F. TOWNER, Esq.

G. E. TUKER, Esq.

Professor T. WALLACE, C.B.E., M.C., D.Sc., F.R.I.C., V.M.H.

The Director:

F. R. TUBBS, Esq., M.Sc., Ph.D.(Lond.), A.R.C.S., D.I.C., F.L.S.

The Representative of the Staff Council:

R. J. GARNER, Esq., M.Sc., N.D.H., Dip.Hort.(Reading).

Co-opted Members:

Professor F.G. GREGORY, D.Sc., F.R.S., Imperial College of Science and Technology, South Kensington, S.W.7.

Sir EDWARD SALISBURY, C.B.E., F.L.S., D.Sc., V.M.H., V.P.R.S., 49 Kew Green, Kew, Surrey.

Lieut.-Colonel Sir ALBERT STERN, K.B.E., C.M.G., M.A., Barham Court, Maidstone, Kent.

Captain R. WELLINGTON, M.C., Colescus, Gorran Haven, St. Austell, Cornwall.

STAFF

(1st October, 1952)

Director: F. R. Tubbs,* M.Sc.(Lond.), Ph.D.(Lond.), A.R.C.S., D.I.C., F.L.S.

Assistant to Director: T. N. Hoblyn,* Hort.Dip.(Wye).

Pomology:

W. S. Rogers,* M.A.(Cantab.), D.Sc.(Lond.), Dip.Hort.(Cantab.), A.Inst.P.
Miss A. B. Beakbane, Ph.D.(Lond.), N.D.H.
N. H. Grubb, M.S.A.(Cornell). *Part-time.*
R. J. Garner, M.Sc., N.D.H., Dip.Hort.(Reading).
D. W. P. Greenham, M.A.(Cantab.).
H. M. Tydeman, *Plant Breeding.*
Miss E. M. Glenn, B.Sc.(Lond.), *Field Records.*
Miss I. Modlibowska, Ph.D.(Lond.).
A. P. Preston, N.D.H.(Hons.).
Miss E. C. Thompson.
Miss B. G. Mosse, B.Sc.(Lond.), Dip.Hort.(Swanley), *Histological Investigations.*
Miss J. M. Paton, Hort.Dip.(E. of Scotland), *Field Records.*
Miss D. J. Wilson, B.Sc.Hort.(Reading), *Field Records.*
Miss M. H. E. Davies, B.Sc.(Lond.). (*Resigned June*, 1952.)
Miss C. P. Nicoll, B.Sc.Hort.(Reading).
J. P. Ruxton, M.A.(Oxon.).
J. E. Goode, B.Sc.(Birmingham).
C. H. W. Slater.
Miss E. Keep, B.Sc.Hort.(Reading).

Assistants (Scientific):

Miss E. C. M. Ashdown.
Miss J. Burton.
Miss S. J. Cogger.
Miss F. M. Hodges.
Miss M. Tapley.
D. G. L. Hooper.
Miss J. M. Kemp.
W. J. Usborne.
Miss H. J. Inkpen.
Mrs. O. B. Wenbourne.

Statistics:

T. N. Hoblyn.*
S. C. Pearce, Ph.D.(Lond.).
G. M. Jolly, B.Sc.(Aberdeen).
G. H. Freeman, M.A., Dip.Stat.(Oxon.).
G. E. Davies, B.Sc.(Wales), *Biometric Studies.*
D. A. Holland, B.Sc.(Lond.). (*Appointed October*, 1952.)

Assistants (Scientific):

Miss J. M. Fuller.
Miss L. V. Stickings.
Miss J. A. Dolding.

* Recognized Teacher of the University of London.

Plant Physiology: M. C. VYVYAN,* M.A.(Cantab.), D.Sc.(Lond.).
D. H. MAGGS, B.Sc.(Reading).
Mrs. M. R. CHEESEMAN (*née* Miss M. R. RAWES). (*Resigned September*, 1952.)
G. F. TROWELL.

Assistants (Scientific):
Miss J. G. SMITH.
R. W. LOVE. (*Resigned March*, 1952.)
J. LARKING. (*Resigned March*, 1952.)
B. E. COATES. (*Appointed May*, 1952.)

Members of Staff of the Imperial College of Science and Technology working in collaboration with the Physiology Section:
E. S. J. HATCHER, Ph.D.(Bristol).
H. W. B. BARLOW, B.Sc.(Edin.). (*Transferred to E.M.R.S. April*, 1952.)
C. R. HANCOCK, B.Sc.(Bristol).
F. W. M. LLEWELYN, B.Sc.(Lond.), A.R.C.S.

Assistants (Scientific):
W. R. MARCHANT. (*Resigned January*, 1952.)
A. H. GREGORY.
D. D. B. SUMMERS. (*Appointed January*, 1952.)

Biochemistry: W. A. ROACH,* D.Sc.(Lond.), A.R.C.S., D.I.C., A.R.I.C.
A. E. BRADFIELD, D.Sc.(Wales), Ph.D.(Wales), *Organic Chemist.*
A. C. MASON, B.Sc.(Lond.), F.R.I.C., *Physical Chemist.*
F. H. VANSTONE, Ph.D.(Wales), A.Inst.P., *Physicist.*
A. E. FLOOD, M.A.(Cantab.), Ph.D.(Manc.), *Organic Chemist.*
H. J. PHILCOX, F.S.T.A.
Miss A. V. DELAP, B.A., B.Sc.(Dublin), *Botanist.*
Miss E. M. FORD, B.Sc.(Lond.), A.R.C.S., *Assistant Botanist.*

Special Assistant:
Miss M. E. BUNYARD, A.R.R.C.

Assistants (Scientific):
H. HUTCHINS.
Miss B. M. KIDWELL.
Mrs. R. D. SOUTER.
R. NEVE.
E. C. WILLS.
Miss M. M. ACOTT.
Mrs. K. O. BURTON.
Miss M. E. JENNER.
Mrs. E. M. TAYLOR (*née* Miss E. M. PRICE).
Miss P. A. NEWMAN.
Miss E. M. H. WILSON.

Members of Staff of the Imperial College of Science and Technology working in collaboration with the Biochemistry Section:
B. D. BOLAS,* D.Sc.(Lond.), D.I.C.
H. C. RUCK, B.Sc.Hort.(Reading).
Miss C. C. MACNAMARA.

Assistant (Scientific):
Miss A. M. SPARY.

Plant Pathology: R. V. HARRIS,* D.Sc.(Lond.), A.R.C.S., D.I.C., M.I.Biol.

M. H. MOORE, M.Sc.(Reading), Ph.D.(Lond.), Dip.Hort.(Reading).

W. G. KEYWORTH, Ph.D.(Lond.), A.R.C.S., D.I.C., M.I.Biol. (*Resigned March*, 1952.)

A. F. POSNETTE, Ph.D.(Lond.), M.A.(Cantab.), A.I.C.T.A.

J. PAINE, B.Sc.(Lond.), A.R.C.S., A.I.C.T.A. (*Resigned December*, 1951.)

J. E. CROSSE, B.Sc.(Birmingham).

D. S. KIRKHAM, B.Sc.(Lond.).

P. W. TALBOYS, Ph.D.(Lond.), D.I.C., M.I.Biol.

J. T. LEGG, B.Sc.(Lond.).

Miss M. BENNETT, B.Sc.Hort.(Lond.), Dip.Hort.(Swanley), *Field records; also attached Entomology and Plant Protective Chemistry.*

P. J. ORMEROD, B.A.(Cantab.).

Miss P. M. GOODE, B.Sc.Agric.(Dunelm). (*Resigned September*, 1952.)

R. CROPLEY, N.D.H., Dip.Hort.(Reading).

Miss E. C. E. ELLENBERGER, B.Sc.Hort.(Lond.).

Miss P. WEBB, B.Sc.(Lond.), *Field records; also attached Entomology and Plant Protective Chemistry.*

J. F. WILSON, B.Sc.(Wales). (*Appointed August*, 1952.)

Assistants (Scientific):

R. D. SOUTER.

Miss B. I. FLEET.

Miss M. M. JOYCE.

Miss S. SQUIRES.

Miss G. W. GOODIER.

Miss H. M. GROVER. (*Resigned October*, 1951.)

N. HARRISON. (*Resigned March*, 1952.)

Miss J. RICHARDSON. (*Appointed October*, 1951.)

Miss C. R. WESTWOOD. (*Appointed January*, 1952.)

J. E. STICKELS. (*Appointed March*, 1952.)

Entomology: A. M. MASSEE,* O.B.E., D.Sc.(Lond.), F.R.E.S.

G. H. L. DICKER, Ph.D.(Lond.), A.R.C.S., F.R.E.S.

M. D. AUSTIN, F.R.E.S., *Red Spider Investigations in Essex.*

R. S. PITCHER, Ph.D.(Lond.), Dip.Agric.(Wye), Dip.Ento.(Wye), *Eelworm and Gall Midge.*

Miss D. E. GRIFFIN, B.Sc.(Lond.), A.R.C.S., F.R.E.S., *Bio-assay of Insecticides attached to Plant Protective Chemistry.*

Miss E. COLLYER, Ph.D.(Lond.), *Beneficial Insects of Fruit.*

Miss J. R. GROVES, B.Sc.Hort.(Reading), F.R.E.S., *Codling Moth and other fruit Tortricids.*

J. B. BRIGGS, B.Sc.Hort.(Reading), *Study of the Geometridae.*

Assistants (Scientific):

E. F. SOUTER.

Miss S. O. PHILCOX.

Miss R. HAMMOND. (*Appointed March*, 1952.)

Plant Protective Chemistry: A. H. M. KIRBY, M.Sc.(Lond.), Ph.D.(Lond.), A.R.I.C.
M. ALLEN, B.Sc.(Lond.).
R. P. TEW, A.R.I.C.
R. G. GAMBRILL.
E. L. FRICK, B.Sc.Agric.(Wales).
Miss W. M. PHILLIPS, B.Sc.(Lond.).

For Biological Assistant, see Miss D. E. GRIFFIN, *Entomology Section.*

Assistants (Scientific):
Miss V. M. DREW.
Miss J. RICHARDSON. (*Transferred to Pathology Section October,* 1951.)
Miss R. H. BISHOP.
R. S. LARGE.
Miss J. A. HITCHCOCK. (*Appointed December,* 1951.)

Scientific Liaison: H. B. S. MONTGOMERY, B.A.(Dublin), Ph.D.(Lond.), D.I.C.
J. H. WALKER, B.Sc.Agric.(Reading).
A. C. PAINTER, O.B.E.
E. G. COKER, B.Sc.Hort.(Lond.), N.D.H.

Clerical Assistant:
Miss M. E. EMM.

Assistant (Scientific):
Miss J. C. IRVING.

Meteorological Records: A. P. PRESTON.
G. F. TROWELL.

Librarian: S. R. BALL, B.A.(Lond.), F.L.A.

Photographer: E. YOXALL JONES.

Assistant (Scientific): Miss D. V. MERTON. (*Appointed October,* 1951.)

FARM STAFF.

Farm Supervisor: F. H. VILLIERS, M.Sc.Agric.Econ., B.Sc.Agric.(Reading), N.D.A.

Assistant Plantations Officer: Miss B. F. SEYMOUR.

Experimental Nurseries: T. V. DIXON.

Experimental Greenhouses: M. M. MACNEILL, B.Sc.Hort.(Wye), C.D.H.(Glos.).
A. TIDY.

Workshops: G. WELLER.
K. W. G. BUNYARD. *Laboratory Instrument Mechanic.*

Farm Staff with twenty-five years' service:
C. BATES (37).
J. DENYER (32).
E. WENHAM (32).
W. HORTON (30).
J. TANNER (30).
H. CRITTENDEN (29).
E. HAYES (29) (*Caretaker*).
W. HENSON (28) (*Fruit Foreman*).
W. JENNER (26).

ADMINISTRATION.

Secretary : C. T. ROYLE, M.B.E., M.C. (*Retired December*, 1951.)
T. R. LITTLEHALES. (*Appointed January*, 1952.)

Assistant to the Secretary : R. L. OXLEY. (*Appointed February*, 1952.)

Book-keeper : P. R. WOOD.

Director's Personal Secretary : Miss P. D. S. GOLD. (*Appointed November*, 1951.)

Clerical Staff : Miss J. M. COY, Miss L. SHERRATT, Miss P. M. RAYFIELD, Miss R. M. WICKHAM, Miss I. CROSS, Mrs. F. J. FITNESS, Miss I. BELL, Miss P. RAYFIELD, Miss K. D. APPS, Miss D. L. CARD, Mrs. B. J. WALLACE (*née* Miss B. J. GOSLING) (*Resigned February*, 1952), Miss C. R. WESTWOOD (*Appointed to Pathology Section January*, 1952), Miss P. HUGHES (*Resigned April*, 1952), Miss P. M. LINCOLN, Miss G. E. WRIGHT, Miss V. THEOBALD (*Resigned June*, 1952), K. C. GOODWIN (*Appointed October*, 1951), Miss A. SLOMAN (*Appointed January*, 1952), Miss E. MORLEY (*Appointed February*, 1952), Miss D. M. SOLLY (*Appointed July*, 1952), Miss M. GETHIN (*Appointed August*, 1952).

VISITORS.

Tours of the Station are arranged by appointment on Tuesday and Thursday afternoons. Visitors with special interests are received by appointment on the mornings of these days and may then join the general tour later if they wish. Wednesdays and Fridays are reserved for visiting research workers who also should make an appointment to ensure that a useful programme for the visit can be prepared.

All visitors wishing to see the work of the Station should go to the Enquiry Office at the Research Laboratories.

Visitors coming by road should take the turning to East Malling, opposite " The Bull ", Larkfield, on the main London-Maidstone road. The entrance gate to the Research Station is on the left, opposite the " King and Queen " in East Malling.

Bus Service : From Maidstone by the Maidstone and District Motor Services Limited, every 20 minutes from Maidstone to East Malling.

Passenger Station : EAST MALLING HALT (British Railways, Southern Region).

Goods Station: AYLESFORD (British Railways, Southern Region).

Correspondence : All correspondence should be addressed to the East Malling Research Station, near Maidstone, Kent.

Telephone : West Malling 3033 (3 lines). *Telegrams :* Research, East Malling.

THE COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

Accommodated at Bradbourne, the Administrative Headquarters of the East Malling Research Station.

STAFF.

Director : D. AKENHEAD, O.B.E., M.A.(Oxon.), B.Sc.Agric.(Lond.).

Consultant Director : F. R. TUBBS, M.Sc.(Lond.), Ph.D.(Lond.), A.R.C.S., D.I.C., F.L.S.

Assistant Director : G. K. ARGLES, Dip.Hort.(Wye), A.I.C.T.A.

Assistants : H. WORMALD, D.Sc.(Lond.), A.R.C.S., D.I.C. (*Retired March*, 1952.)
V. H. GOLDSCHMIDT, Ph.D.(Berlin).
J. DUNDAS, B.Sc. (*Appointed June*, 1952.)
Miss P. J. ROWE-DUTTON, B.Sc.Hort.(Lond.).
Mrs. E. ULYATT, Dip.Hort.(Eisgrub.).

Clerical Staff : MISS M. B. ROGERS, Miss M. M. DURLING, Miss J. E. MORRISON, Mrs. J. WEBB (*née* Miss J. CRANHAM).

NATIONAL AGRICULTURAL ADVISORY SERVICE

Accommodated at Bradbourne, the Administrative Headquarters of the East Malling Research Station.

Telephone : West Malling 2418.

PROVINCIAL ADVISORY OFFICER—FRUIT, SOUTH-EASTERN PROVINCE

W. G. KENT, N.D.H.

Clerical Assistant : Mrs. J. E. WALDREN.

GENERAL DEVELOPMENT AND ACTIVITIES

Introductory.

The year which this Fortieth Report of the Executive Committee describes has been remarkable for at least three major events, each one of which may well affect developments at the Station for many years to come.

On the 20th March work commenced on the extension to the E.M.B. Building. When the extension to the Manwaring Building, the plans for which are already approved, is completed there will be at least double the existing laboratory accommodation available. These extensions will give adequate accommodation for a scientific staff which has grown from 32 in 1930, when the last laboratory was built, to 124 at the present day and enable us to welcome more research workers and postgraduates from at home or abroad who wish to work with us for short or long periods. This does not mean that the importance of the Station's work in the field relative to that in the laboratory will by any means diminish ; as always the laboratory work will be a very necessary adjunct to the vital work with the growing tree in the orchard.

In May, a Visiting Group nominated by the Agricultural Research Council, consisting of Professor K. Mather (Chairman), Mr. F. C. Bawden, Professor T. A. Bennett-Clark and Sir John Simonsen, accompanied by Mr. W. G. Alexander, Dr. E. E. Cheesman, and Mr. G. E. Samuel, spent three days at the Station. During this visit many aspects of the Station's work were discussed and the Group had numerous talks with individual members of staff. It was generally felt that the visit had an interest and value to the Station extending well beyond its formal purposes and the Committee would like to express their appreciation of the very considerable amount of time given by the members of the Group to the Station's affairs.

Later in this Report some account is given of the Station's part in the Thirteenth International Horticultural Congress held in London in September. The event was the occasion of visits to this country of many distinguished horticultural scientists from all over the world, many of whom visited East Malling. The mutual exchange of information and ideas can only be wholly beneficial to the advancement of science.

The year 1953 in which this Report will appear marks the fiftieth anniversary of the Long Ashton Research Station; the Committee take this opportunity of extending their congratulations and warm good wishes to our sister Institute in this notable year.

Obituary.

During the past year the Station has lost three old friends, each one of whom has given valuable service in his particular sphere. Our connection with Sir Frederick Keeble, who died in October 1952, goes back to the days of the Wye College Fruit Experiment Station, for it was in his room in the Food Production Department at the Board of Agriculture, in August 1919, that the first draft of the constitution of the Committee of Management of the new Research Station was threshed out and its terms of reference discussed. In April 1920 he was nominated to represent the Ministry of Agriculture on that Committee and continued to serve as Governor of the Institute until he retired in September 1948.

Professor F. T. Brooks' connection with us likewise goes back to the very early days, through our mutual interest in the control of Silver Leaf in plums and cherries. He was, therefore, no stranger to us when he succeeded Sir Rowland Biffen as a Governing Member representing the University of Cambridge in 1942, being immediately elected to the Executive Committee on which he served until his death in March 1952. The occasions on which he has helped us are too numerous to mention individually.

Mr. George Monro, who died in November 1951, succeeded Sir Bernard Greenwell as one of the Trustees of the Development Fund in April 1942 and was always ready to give his advice and assistance when required in connection with the Fund.

The Committee would place on record their gratitude to all three, each one of whom has materially contributed to the welfare of the Station.

GOVERNING MEMBERS.

Professor G. E. Briggs, M.A., F.R.S., was appointed in June as a Governing Member to represent the University of Cambridge in succession to Professor Brooks. We were glad to welcome him here at the Annual General Meeting in July.

At the meeting of the Executive Committee on the 12th December, 1951, the Chairman presented to Mr. C. T. Royle a gold wristlet watch on behalf of the Governing Members, in recognition of his eighteen years' wholehearted work as Secretary to the Research Station. Later, Mr. Royle was elected an Honorary Life Member of the East Malling Research Station Association.

The special programme arranged on 27th June for the annual visit of the Governing Members began with a conducted tour of the building work in progress on the new laboratory extensions. After this several members of staff discussed aspects of their research including field trials of organic fungicides, new work on stock/scion relationships, the development of the flame spectrograph for quantitative analysis, the life history of the Summer Fruit Tortricid and the role of eelworms in strawberry diseases.

COMMITTEES.

The Governing Members elected Professor E. J. Maskell, F.R.S. to the Executive Committee, in succession to the late Professor Brooks, in June 1952.

The quarterly meetings of the Executive and Finance Committees were held as usual.

The Building Sub-Committee (Chairman, Mr. J. F. Towner) met in October 1951 to draw up a list of firms who should be invited to tender for the Laboratory Extensions contract and also considered the plans for the Sports Pavilion.

The Plant Prices Sub-Committee (Chairman, Mr. W. T. Edmonds) met in London in June and recommended procedure for the distribution of the new woolly aphid resistant rootstocks and the prices for these and other material in the Distribution List.

The following were the main subjects not mentioned later in the Report that have been dealt with by the Committees.

Appointment of Secretary.

Last year the impending retirement of Mr. C. T. Royle was announced and an appreciation of his services appeared in the Research Report. The Committee appointed Mr. T. R. Littlehales as his successor from the 1st January, 1952. Mr. Littlehales is already known to many Members, having served his apprenticeship as Assistant Secretary for two years. At the same time the Committee recommended the

strengthening of the Station's accountancy staff, rendered very necessary by the growth of the Station and the ever-increasing complexity of the accounts.

During the first three months of the year Mr. Royle continued to come regularly to the Station, giving valuable assistance to his successor in an advisory capacity. This help was acknowledged by a special resolution at the June meeting, when the Executive Committee were also able to express their satisfaction at the inclusion of his name in Her Majesty's Birthday Honours' List.

Laboratory Extensions.

Considerable progress has been made during the year with the much needed extensions to our Laboratories. With the Ministry's approval the plans were put out for tender to firms selected by the Building Sub-Committee, the contract, which was signed on the 8th March, being eventually given to Messrs. G. E. Wallis & Sons, Ltd.

As a preliminary to the main operations, it was necessary to clear away certain storage huts, housing the field equipment of various Research Sections. These were replaced by a new laboratory store, which was erected on the site of the old farm store. This was the Station's first packing shed, an ex-army hut that was put up in 1920, and has served many purposes in the intervening years.

The main building plans are divided into two phases and, up to the time of writing, sanction has been given only to phase 1. The most important part of this phase is the new wing of the E.M.B. Building ; but it also includes the installation of a central heating plant, the construction of the new wing to the Manwaring Building up to ground floor level and the transfer of the photographic studio to the bungalow, erected in 1914, which was the Station's first laboratory and office combined.

The new studio is now completed and occupied ; pending more permanent accommodation, the Scientific Liaison officers and typing staff are occupying temporary quarters in the packing shed. The E.M.B. extension, which has now reached roof level, will give new accommodation for the Biochemistry, Physiology and Statistics Sections and enable the Pomology Section to expand in the older part of the Building.

The completion of the new Manwaring wing and the adaptation of the N.F.U. Building for the Scientific Liaison Section and administrative use constitute phase 2. It is hoped that by the time this Report appears in print the necessary sanction will have been obtained to enable the work to proceed and the whole scheme to be completed.

In the meantime, much inconvenience and some dislocation of laboratory work are inevitable ; but the Committee are assured that they can rely on the co-operation and goodwill of the whole staff, so that any difficulties that may arise will be overcome.

Sports Pavilion.

By the end of the financial year £2,411 12s. 10d. had been contributed towards the Sports Pavilion, £1,793 10s. 6d. by the Members, as a result of the joint appeal by Mr. Wickham and Mr. Seabrook, and £618 2s. 4d. by the staff through direct subscription and savings from the Amenities Grant. The plans were prepared by Mr. Cecil Burns and the shell of the pavilion has now been completed on the west side of the cricket pitch. The balance of £1,427 6s. 6d., so far unexpended, has been placed in a P.O. savings account.

Buildings and Land.

The Chairman of the Building Sub-Committee made his usual inspection of the Research Station properties, and routine painting and repairs, carried out mainly by our own maintenance staff, have proceeded according to plan.

In February the opportunity occurred to purchase another house in Maidstone and No. 75 Grace Avenue, was purchased by the Association and let to the Secretary.

With the aid of a grant from the Ministry, Bradbourne Lodge cottage, near East Malling village, has been improved and extended ; renovations have also been carried out in Park Farm cottage.

Members will be aware of the Committee's concern at the acute shortage of land for experimental use that has been developing in recent years. While there seems no immediate prospect of adding materially to the size of the farm, the existing position has been safeguarded by the purchase of Upper Grub field and Newgates Shaw—an area of 14½ acres that has been rented since 1929—at the extreme eastern end of the farm. This has been achieved with the aid of grants from the Ministry and the East Malling Research Station Association.

Caretaking Station Property.

Since the Wye College Experiment Station was founded in open country surrounded entirely by farming or park land, very great changes have taken place in the Malling district. We are now very nearly hemmed in by industrial or urban developments, the latest of which is a housing estate adjoining our western boundary. With all these changes it has become increasingly difficult to safeguard our buildings and experimental plantations against trespass and damage ; for example, the breaking down of a wire netting fence during the winter months may let in the rabbits and so cause untold harm to a vital experiment. The position is not helped by two public footpaths running from East Malling to Barming and to Ditton. Arrangements have now been made for more efficient caretaking and increased supervision out of working hours. It has also become necessary to close and lock certain gates during these periods to prevent the use of our service roads as public highways. The Committee regret this necessity, but can see no alternative.

Portraits of Sir Ronald Hatton and the Chairman.

It is with pleasure that we report the acquisition of a portrait of Sir Ronald Hatton painted by Reginald Lewis. So successful was this painting that the same artist was commissioned to paint a portrait of our Chairman, Mr. Thomas Neame, which has now been completed.

Both these portraits hang in the Director's Room at Bradbourne, together with those of our former Chairmen, Mr. Percy Manwaring and Mr. Spencer Mount.

Annual General Meeting.

The Thirty-second Annual General Meeting was held at Bradbourne on the 16th July, 1952, under the Chairmanship of Mr. T. Neame. Twenty-one members of the Governing Body and sixteen Fellows and Members of the Association were present.

The Director presented the Administrative and Research Reports for the year 1950-51, commenting on the various activities that had taken place during the year and briefly reviewing the research in progress.

Professor Briggs, the newly appointed representative of Cambridge University, moving the adoption of the Report, congratulated the Station on the scientific achievements reported. Mr. Dunstan Skilbeck, Principal of Wye College, seconding, emphasized the importance of training postgraduate students who would become the research workers of tomorrow.

The Finance Chairman, Mr. J. W. S. Mount, presented the Balance Sheet and Accounts for 1950-51, as set out in the Administrative Report for that year. He referred to rises in the cost of labour and materials on the one hand and the difficulty of meeting the Ministry's request for a reduction in our estimates on the other. While keeping general expenses to a minimum it had been the Committee's policy to maintain Station property in good repair. He also commented on the increasing cost of running the experimental farm, despite which, expenditure had been successfully kept to a minimum.

The Report was adopted on the proposition of Sir Edward Hardy, supported by Mr. A. M. Bear.

Messrs. J. Dix Lewis, Caesar, Duncan & Co. were reappointed Auditors.

Finance.

The Research Account.

The Ministry's Grant is now received in two parts, which are shown separately in the Research Account for 1951-52. The grant of £90,537 for salaries is considerably larger than in the previous years, due to normal increments and a general rise in salary rates. On the other hand, there is approximately an 18 per cent decrease in the Maintenance Grant, which reflects the Station's efforts to economize in estimating for that year, particularly in laboratory apparatus and equipment. The contribution from the East Malling Association is about the same as the previous year. The adverse balance on the account is due mainly to a large rise in the costs of electricity, gas, coke, coal and water.

Research Account.

1st October, 1951, to 30th September, 1952.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Salaries, National Insurance and Superannuation ..	90,537	8	7	Salaries, National Insurance and Superannuation ..	89,282	0	0
				Balance due from Ministry of Agriculture	1,255	8	7
Laboratory Expenses and Equipment	8,069	16	11	Maintenance Grant	17,454	0	0
General Maintenance Expenses	12,913	9	5	Contribution from East Malling Association	1,472	0	0
				Sundry Receipts	568	2	3
				Balance net deficit	1,489	4	1
	£111,520	14	11		£111,520	14	11

The very small Supplementary Grants Account is not given in this Report this year; it consists solely of a small Agricultural Research Council grant towards the maintenance of the Essex Red Spider Investigations.

The Experimental Farm Account.

This account continues to reflect the increasing cost of running an experimental fruit farm, a high proportion of which is occupied by intensive experiments which, essential as they are to the research programme, are very expensive in labour and yield

little marketable fruit. Rises in the wage rates for farm workers have made it impossible to prevent any longer a marked increase under this heading, while almost all other items needed for the farm have also risen in price. Every grower knows that the selling price of fruit has not risen in proportion, while the demand for nursery material in 1950-51 was almost at its lowest ebb. Despite another favourable fruit season, therefore, the sales of produce and crops were about £1,000 less than in the previous year. The resulting excess of expenditure over income was foreseen and will be met by the Ministry.

EXPERIMENTAL FARM ACCOUNT.

1st October, 1951, to 30th September, 1952.

EXPENDITURE.	£	s.	d.	INCOME.	£	s.	d.
Farm Wages	29,992	4	5	Sale of Produce and Crops	23,228	16	2
Farm Manures and Sprays	3,809	14	5	Sale of Livestock	1,411	1	9
Livestock	1,165	17	6	Sundry Receipts	2,333	10	0
General Farm Expenses, Implements and Repairs	16,243	12	1	Balance being excess of Expenditure overIncome	24,238	0	6
	£51,211	8	5		£51,211	8	5

THE EAST MALLING RESEARCH STATION ASSOCIATION.

This year the Association accounts are presented in the form of an Income and Expenditure account and a Balance Sheet. In the first, the income from subscriptions and donations at £4,265 is slightly less than in 1951. The grant for research is as usual based on the previous year's income. General expenses, which include the cost of the two portraits mentioned above, amounted to £1,187 and the grant of £250 towards staff recreations was repeated. In addition, the Association paid a final instalment of the amount promised towards the staff houses (Church Fields) and contributed £150 towards the purchase of Upper Grub field. The balance of £1,169 is taken to the Balance Sheet. This sets out the value of the Association's investments and properties to which must now be added No. 75, Grace Avenue, purchased during the year. The value of these more than covers the Bank overdraft of £5,761. The number of Fellows, Members and Associates at the end of September was 2,031, a decrease of 26 on last year.

THE EAST MALLING ASSOCIATION INCOME AND EXPENDITURE ACCOUNT.

1st October, 1951, to 30th September, 1952.

EXPENDITURE.	£	s.	d.	INCOME.	£	s.	d.
Research Grant	1,472	0	0	Subscriptions and Donations	4,265	0	10
Evening Class Fees	4	5	0	Interest on Investments	153	0	0
General Expenses	1,187	4	3	Miscellaneous Receipts	433	14	8
Staff Recreation	250	0	0				
Sundry Grants :							
Staff Houses (Church Fields)	619	3	8				
Upper Grub and Newgates Shaw	150	0	0				
Surplus	1,169	2	7				
	£4,851	15	6		£4,851	15	6

East Malling Association Balance Sheet.

at 30th September, 1952.

	£	s.	d.		£	s.	d.	£	s.	d.
Accumulated Members Fund :				*Freehold Property at Cost :*						
As at 30th September, 1951 ..	14,582	17	1	"Fircroft" ..	2,577	16	5			
Add Surplus for year	1,169	2	7	"Grange" ..	6,214	17	2			
				31 Buckland Lane	2,567	1	2			
	£15,751	19	8	59 Grace Avenue	2,299	6	0			
Liabilities :				*Purchased during the Year :*						
Bank Overdraft	5,761	18	5	75 Grace Avenue	2,854	17	4			
								16,513	18	1
				Investments at Cost :						
				£2,000 3% Funding Stock 1966/68 ..	2,000	0	0			
				£3,720 11s. 2d. $2\frac{1}{2}$% Consols ..	3,000	0	0			
				(Valuation 30th September, 1952, £3,878)				5,000	0	0
	£21,513	18	1					£21,513	18	1

Members' Days.

Four days for Members and Associates were held during the year under review. On 22nd November, 1951, preceding the fourth Amos Memorial Lecture, demonstrations were given of machinery developed at the Station for earthing up, harvesting and grubbing rootstocks, for lifting young nursery trees and for planting bedded rootstocks and cuttings. A modified spraying machine for stoolbeds and nursery trees was also shown. The attendance was about 170.

On the 20th March, 1952, before handing over to their successors, Dr. W. G. Keyworth and Mr. J. Paine reviewed the work on hop diseases to date. The research on Verticillium Wilt was described and details of the new wilt-resistant varieties were given. In the afternoon the programme dealt with the search for vectors of the virus diseases of hops and concluded with discussion of the problems of producing healthy planting stocks. About 100 Members attended.

Virus diseases of fruit attracted another 100 Members on 2nd July, 1952. Recent work on virus diseases of strawberries and top fruit and their vectors was described in the morning; Members were then shown the air-conditioned glasshouses specially erected for these investigations and various examples of the effects of virus diseases on cherries, cherry rootstocks, apples, pears and plums. In the afternoon, the important work of indexing, selecting and producing virus-free rootstock and scion material in quantity was discussed.

On 25th September, about 130 Members assembled to see the outcome of 30 years' work in the breeding of the new Malling-Merton series of rootstocks. After hearing the history of the breeding, done in collaboration with the John Innes Horticultural Institution, and the testing of the stocks for Woolly Aphid resistance, Members inspected field trials of 8 year old trees on the new rootstocks. After lunch, the nursery behaviour of these rootstocks was described and demonstrated in stoolbeds growing under commercial conditions. This programme was followed by the fifth Amos Memorial Lecture.

Amos Memorial Lectures.

Our Chairman, fresh from his world tour, delivered the fourth lecture in the Staff Canteen on 22nd November, 1951, following the Members' Day. With Sir Ronald Hatton in the chair and an audience of almost four hundred, Mr. Neame outlined English fruitgrowing practice as he knew it in 1919, the advances made since, and his ideas about the future. He was able as he proceeded to compare these with practice and opinions met with overseas, and his comments led to a lively and interesting discussion.

The International Horticultural Congress provided us with the opportunity of welcoming one of the leading horticultural scientists of the U.S.A. and an old friend of the Station, in the person of Professor H. B. Tukey of Michigan, to give the fifth Amos Memorial Lecture on 25th September, 1952. He spoke on research developments in fruit culture in America before an audience of more than three hundred fruitgrowers, scientists and students. The lecturer's obvious appreciation of the practical aspects strengthened his case in pleading the value of fundamental research and led to a vigorous discussion.

Staff.

There have been comparatively few changes among the senior research staff during the year. The staff of the Pomology Section has remained unchanged, save for the loss of Miss M. H. E. Davies, who resigned in June on her marriage to Dr. N. Naunton Davies ; we are glad that she will be remaining in East Malling.

At the end of the year, Mr. D. A. Holland joined the Statistics Section—after preliminary training, he will act as a link between the statisticians here and the various N.A.A.S. experiments at Experimental Horticulture Stations and elsewhere for the design of which the Section is responsible. We congratulate Mr. G. H. Freeman on the award of the degree of Master of Arts by the University of Oxford.

In October 1952, Dr. M. C. Vyvyan reached the retiring age and, though we are very glad to report that he will be continuing his work on rootstock-scion relationships, as from that date he retired from his position as Head of the Section. Dr. Tubbs is taking over the direction of the Section's research programme, and in this he will be assisted by Mr. H. W. B. Barlow as Deputy Head of Section. Mr. Barlow has worked here as a member of the staff of the Imperial College, Institute of Plant Physiology, since August 1946, but transferred to the staff of the Station in April 1952. Mrs. Cheeseman (formerly Miss M. R. Rawes), who had continued her work with the Section since her marriage in 1951, resigned in September 1952.

Dr. W. G. Keyworth returned, in November 1951, from his year in the United States on special leave, but resigned in March 1952, to accept the appointment of senior plant pathologist at the National Vegetable Research Station, Wellesbourne, Warwickshire. Dr. Keyworth joined the staff of the Pathology Section in 1938, since when he has made notable contributions to the pathology of the hop and, indeed, to hop research in general. During his 14 years at East Malling he entered fully into the life of the Station, acting first as secretary of the Staff Council and later, for 2 years, as its representative on the Governing Body. He leaves to take up this new and important post with the good wishes of us all. Miss P. M. Goode, who had also been working on field experiments in connection with hop diseases, particularly Verticillium Wilt, resigned for family reasons in September 1952, and her place has been filled by Mr. J. F. Wilson, who joined us in August. He had been collaborating with the Pathology Section for

some time previously and so comes with a good knowledge of the work. We congratulate Mr. R. Cropley on the award of the National Diploma in Horticulture.

We also congratulate Mr. E. G. Coker of the Scientific Liaison Section, who was awarded the N.D.H. at the same time as Mr. Cropley.

There have again been a number of changes among the Assistants (Scientific), though fewer than in recent years. These changes are all set out in the staff list at the beginning of this Report.

The retirement of Mr. C. T. Royle and the appointment of Mr. T. R. Littlehales as Secretary of the Station have already been mentioned. In February 1952, Mr. R. L. Oxley was appointed as Assistant to the Secretary. Prior to this, in November 1951, Miss P. D. S. Gold came to fill the post, vacated by Miss L. M. Read, as Personal Secretary to the Director. Other changes in the administrative staff are included in the staff list. No Research Station can work without its clerical staff, and though, as in the case of the Assistants (Scientific), we do not mention them here for reasons of space, their services are fully appreciated.

There have been no changes among the senior members of the farm staff. We have again included in the list the names of nine members who have served the Station for twenty-five years or more. The running of the experimental fruit and arable farm is never an easy task, the greatest care being required to see that all experimental trees and plants have the best possible treatment ; the value of the patience and skill of our farm staff cannot be overestimated.

In the Bureau we have to report with regret the retirement of Dr. H. Wormald. It is now thirteen years since Dr. Wormald retired from his post as Assistant Director of the Station and seven years since he left the Pathology Section for the Bureau. During those years he has been little seen at the Laboratories, but at Bradbourne his unrivalled knowledge of the pathology of fruit trees and command of foreign languages have been invaluable to the Bureau. Even now we learn that he is contributing his quota to Horticultural Abstracts from his home, even though he can no longer be with us. Mr. J. Dundas was appointed in June to fill Dr. Wormald's place in the Bureau.

We welcome all those who have joined us during the year and extend our good wishes to those who have left.

With the Station the size it is now, the work of the various Committees that assist the Director grows more important each year. Once more we thank the personnel of the Library (Chairman, Mr. Akenhead), Greenhouses (Chairman, Mr. Hoblyn), Workshops (Chairman, Mr. Villiers), and Photographic Studio (Chairman, Dr. Montgomery) Committees for their valuable assistance. The Canteen Advisory Committee (Chairman, Mr. Argles) has had a particularly arduous year and all those who use the Canteen must be grateful to its members for the work they do on behalf of their colleagues.

Social and Athletic Activities.

Progress towards the completion of the Sports Pavilion has already been alluded to. Once again the Association has made a generous grant towards staff recreations which has been greatly appreciated.

Dr. Pearce was this year elected Social Secretary to succeed Miss Seymour who, after three years' service, did not wish to stand for re-election. We all thank her for the painstaking and good-humoured manner in which she has carried out this rather difficult job.

The Christmas Party was held at Bradbourne on the 17th and 18th December, 1951, and again consisted of a variety entertainment followed by a dance. Each year the Standing Committee have thoroughly explored the feasibility of holding a sit-down supper for all at the same time, but as yet no way of doing this has been found.

The number of children belonging to the staff continues to grow—we hardly know how to comment on this—and this year there were nearly 130 of them at the party, which was held on a glorious day at Bradbourne on the 26th July. This year as usual all were out to enjoy themselves and we congratulate the willing team of helpers who made sure that none of them went home disappointed. Indeed, it was difficult to enforce the Social Secretary's final injunction to his team that at 6.30 p.m. they should firmly encourage the visitors to go home !

The athletic clubs all report enjoyable seasons. This year the Hockey Club got into full swing, playing twelve matches and numerous practice games. Great keenness was shown and the Club have already a full fixture list for 1952-53.

The number of members of the Cricket Club was somewhat reduced and it is hoped to remedy this in 1953. Nevertheless, a full programme included some twenty games and, at the match on the 16th July, the Club had the satisfaction of defeating the Members for the first time on record. The Tennis Club enjoyed the good weather and full use was made of the courts ; the new arrangement to allow a limited advance booking of the court was much appreciated. The Club has thirty-eight members. The Table Tennis Club now has a second table, which gives much more scope for play on Club nights. Nine matches were played and, if the results were not always in our favour, we wish them better luck next season. The Boat Club has a small membership, which really comes into its own at the Children's party, when its members literally put their backs into the entertainment of our small guests.

The Garden Club continues to flourish, and if its members cannot all compete with Mr. Grubb in new or exotic vegetables or the Plantation Assistants in their exhibit at the Annual Show, this year on the 12th July, they are, none the less, enthusiastic. The Club arranged outings to the gardens at Radnor Cliff House, Folkestone, where they were joined by Sir Ronald and Lady Hatton, and to the Bedgbury Pinetum.

The Dance Club and the Folk Dance Club continue to cater for the lovers of ballroom and country dancing. The former organized a dance in November, which enabled them to make another donation to the general fund ; the latter now concentrate on Square Dances and, while the enthusiasts aver that the modern kind are based on those run for years by the English Folk Dance Society, their present day popularity is undoubted.

The former Gramophone Society has now widened its scope and will in future be known as the Music Club. Fourteen gramophone concerts and one " live " one of chamber music were well attended. The latter development will be helped in future by the acquisition of a new piano to the cost of which members of the Club have contributed. The Club organized three expeditions to attend an opera and two concerts in London.

One of our oldest social institutions is the Play Reading Society ; this year fourteen plays were read, including a very wide variety. The annual party had an attendance of seventy, when " The Importance of being Earnest " was read.

Finally, two Clubs, for the devotees of chess and for the enthusiastic photographers, have gone quietly on their ways, each providing an outlet for the interests of a few members of staff.

Postgraduate Students.

As has been mentioned, there have been fewer changes this year in the research staff and it seems likely that we are entering a period of greater stability than during the last five years or so. In these circumstances, the advent of postgraduate students, who are already doing research or are potential research workers, particularly from abroad, is likely to be very valuable, since they often bring with them fresh ideas and critical minds. It is unfortunate, therefore, that we have only been able to welcome a very limited number of them during 1952, and that this state must continue until our new buildings are completed. It is hoped that by that time currency and other restrictions will have eased and that perhaps the exchange of research workers with the Commonwealth will again be possible.

Candidates for Higher Degrees.

In October 1952 there were fifteen postgraduates registered with the University for Higher Degrees. Of these, twelve were members of the research staff and three students, two from Canada, one each in the Physiology and Entomology Sections, and one from the United Kingdom, in the Pomology Section.

In July, Mr. A. F. Posnette of the Plant Pathology Section was awarded a Ph.D. degree for a thesis entitled " Virus diseases of fruit crops in Britain with special reference to stone fruits ".

Also in July, Mr. A. Wakil Khan, who had been working in the Pomology Section, was awarded a Ph.D. degree. His thesis was entitled " Studies in the use of certain permanent mulches and weedkillers in fruit plantations ". He has now returned to Afghanistan with the good wishes of us all.

We congratulate both Dr. Posnette and Dr. Wakil Khan.

Short-term Research Students.

Although we had numerous visitors this year for varying periods, as recorded elsewhere, we could only accept five who wished to stay and work with us for longer periods.

We were grateful for the assistance of Miss C. B. M. Baker at the Field Laboratory, Great Braxted during the busy season in May, and were glad to be able to keep her for a further month as a temporary recorder. Mr. R. G. White of the Gold Coast spent three weeks in June studying propagation methods at the request of the Colonial Office. Mr. R. H. Jensen from Denmark worked for a month in June in the Plant Protective Chemistry Section. In October 1952, Mr. E. Rihm from Chile, a postgraduate student at the Imperial College, came to work for three months with the Physiology Section, and Mr. D. Way, a student of the Royal Horticultural Society, commenced a year's study in the Pomology Section.

Temporary Recorders.

The scheme to give University students experience in field experimental recording during vacation periods is very popular and fifty-two applications were received for sixteen vacancies of a month each. Five of these student recorders worked with Pomology, four with Entomology, three each with Physiology and Plant Pathology, and one with the Biochemistry Section ; they came from nine Universities in the United Kingdom. Without exception good reports were received of their work and, if only

a few of them eventually become research workers, any small trouble we have taken with them will be well worthwhile. In the meantime, we thank them all for their really useful contributions to our work. As we write, in January 1953, we are already receiving applications for next summer.

Plantation Assistants.

We still have no lack of applicants and have had no difficulty in maintaining our team of twelve, at present four girls and eight men.

Again the plantation assistants have been of material help in research, carrying out the exact cultural or pruning treatments demanded in each of a wide variety of field experiments.

The winter lecture programme, organized again by Mr. A. C. Painter, is a much appreciated feature of the assistants' normal two-year stay with us. This year an interesting morning was spent at Covent Garden Market.

Of those who have recently completed the course, A. Veevers, R. Farrell and H. Abbatt are working in commercial horticulture, J. Williams is working and teaching at Waterperry Horticultural School, L. Glock is on a course in farm management at the Leicestershire Farm Institute.

Of those who have been with us in the past, apart from those now engaged in commercial horticulture and the four who are now members of staff at East Malling, six are engaged in various activities of a research or advisory nature. We are always glad to hear from them and send them our good wishes.

Staff Discussions.

There were eight staff discussions during the year. Mr. D. Akenhead, Director of the Commonwealth Bureau of Horticulture, described his recent world tour and the research in progress at numerous centres in Africa, Australia, New Zealand, Hawaii and Canada. Dr. G. H. L. Dicker reviewed entomological research he had seen in Holland, and Dr. W. G. Keyworth, following a year's work at New Haven, Connecticut, gave us some impressions of plant pathology research in the U.S.A. Other discussions were concerned with virus diseases of hops and fruit, spray damage, rootstock studies, and plant chemotherapy.

In September we were delighted to welcome Dr. F. W. Went, Director of the Earhart Laboratory at the California Institute of Technology. Dr. Went, with the help of a colour film, described his unique phytotron, designed to study the effects of environment on plant behaviour. He followed with a series of slides, in colour, depicting the behaviour of minute annual plants under the extreme conditions of the Californian desert.

Research Tours.

Apart from Dr. W. G. Keyworth's secondment to the Agricultural Experiment Station, New Haven, Connecticut, already referred to, it has been possible, for the first time since the war, for a member of the research staff to make an extensive tour of fruit-growing areas and research institutes in North America. As a member of a special fruit course organized by the Mutual Security Agency, Dr. Montgomery was able to spend twelve weeks during the summer in the United States. During this period he saw

various fruit growing and marketing practices in the States of Massachusetts, Utah, California, Oregon and Washington and also visited the Agricultural Colleges and Research Centres in these States as well as at Beltsville, State College, Pennsylvania, and Ithaca, New York. Much up-to-date information was gained and many useful contacts made. We hope that this visit will pave the way for further visits in the not too distant future.

In June, Mr. Hoblyn spent a valuable and instructive ten days in Holland visiting centres of horticultural research in the vicinity of the Hague, Groningen, Wageningen and Wilhelminadorp, with the object of studying recent advances in horticultural knowledge and, in particular, experimental design and technique.

Following the Third International Congress of Crop Protection in Paris, during September, Dr. Kirby visited government and commercial experiment stations in Switzerland, West Germany and the Netherlands, while, Dr. Moore, who also attended the Congress, spent five days in Holland touring institutes dealing with research on fungicides.

Dr. Roach and Dr. Vanstone both joined a tour of representative areas of Ireland organized in connection with the International Soil Fertility Conference in Dublin.

The recent occurrence of the Summer Fruit Tortricid in South-East England led to a ten day visit by Miss J. R. Groves to Belgium and Holland, where she was able to discuss problems in connection with this pest with research workers who have had experience of it in the Netherlands.

All the above tours were made with the assistance of grants from the Agricultural Research Council.

In connection with their various activities, visits were also paid to research and experiment stations within the United Kingdom by several members of staff.

Collaboration.

We have already written in previous Reports of the Station's close connection with the new N.A.A.S. Experimental Horticulture Stations. The fruit plantations at these Stations are now beginning to take shape, and apart from their design, many members of staff have an interest in one or other of the experiments that are being laid out; some of these are direct extensions of our own research here; others are joint projects in which we are collaborating.

The new Station at Rosewarne, Camborne, Cornwall was visited during the year and a limited programme for fruit research is being drawn up.

Collaboration with the National Fruit Trials should be specially mentioned this year. Hitherto our contribution has been mainly concerned with the search for a suitable farm and the design of variety trials at Experimental Horticulture Stations. Now that the former end has been achieved, we look forward to an even closer association with the work of the new central N.F.T. Station at Brogdale Farm, near Faversham, Kent.

Apart from the above, the list of investigations in which we are collaborating with the N.A.A.S. staff is too long to give in detail here and we must confine ourselves in the main to new enterprises.

Among these, the Pomology Section instance blossom-thinning trials and propagation trials of blackcurrants. The new commitments of the Statistics Section, foreseen last year, have now been confirmed and in these the Scientific Liaison Section will also give much help in the preliminaries before new experiments, usually on growers'

plantations, are commenced. The Pathology Section is collaborating with the National Fruit Trials in virus tests of commercial plums and with the fruit specialists in Wales in developments in special stock strawberry certification.

Many of the long-standing investigations in which we have been collaborating with other research workers have continued during the year. Once again we have pleasure in recording our close association with our sister research institutes at Long Ashton and Bayfordbury, with the Ditton Laboratory, Wye College, the Institute of Plant Physiology, Imperial College of Science, the Scottish Research Institute at Dundee, the National Institute of Agricultural Engineering, the Meteorological Office, the Fuel Research Station and the Botany School, Cambridge. Some of the joint projects have been initiated as a result of Conferences organized by the Agricultural Research Council, but others have arisen naturally from the work and the anxiety of research workers in different parts of the country to pool their knowledge so that the problems of the industry may be more rapidly solved. All this is evidence of the healthy state of horticultural research in this country as a whole and must be very gratifying to our supporters among fruitgrowers and others.

A study of nectar secretion in apple blossom, as affected by manuring, is a new line of work being carried out by Miss Ryle of the Bee Department at Rothamsted, using material from our apple manurial trial. A very different study, of the fibre structure of apple shoots affected with Rubbery Wood, by Dr. Preston of Leeds University, for which we have supplied material, should help towards the elucidation of the effects of this trouble. We have also been consulted by the Horticultural Department of Nottingham University and have loaned soil moisture tensiometers for a trial of irrigation under glass. The identification of chlorogenic acid in apples by Dr. Hulme, in collaboration with our Biochemistry Section, has not been mentioned before and is another instance of our close contact with the Ditton Laboratory.

Problems in pure bacteriology having a bearing on Bacterial Canker of stone fruits are now being studied with Dr. T. Gibson of the Edinburgh and East of Scotland Agricultural College. We have already mentioned virus tests of plum varieties ; such testing of varieties of plum, cherry and pear are being conducted also in association with Mr. M. B. Crane of Bayfordbury.

The successful collaboration of research workers, manufacturers and fruitgrowers, embodied in the A.R.C.-Pettar-ACE Red Spider Investigations in Essex, has now continued for nine years and we are grateful to all our collaborators who have contributed orchards, spray materials and recorders, to say nothing of office assistance, and particularly to the Essex Institute of Agriculture in whose orchards at Writtle so much of the work has been done. In this connection we have also collaborated with Mr. W. H. Read of the Glasshouse Station at Cheshunt in investigations on summer ovicides.

Lastly, we would mention the various institutes abroad, some of which we have been able to visit during the year, as recorded above, and with whose workers we have been able to hold valuable consultations. The International Horticultural Congress was particularly fruitful in this respect. To many institutions we have sent collections of rootstocks, varieties and other plant material, even apple blossom pollen ; and, while it is no easy task to gather together and despatch a varied assortment of plants, packed so that they will arrive at their destination in good condition, we do not grudge this contribution to the general advancement of horticultural science, especially as we receive many plants in exchange.

To all our collaborators at home and abroad we once again express our grateful thanks.

Outside Trials.

We have already alluded to our work in collaboration with N.A.A.S. Officers, much of which entails trials on growers' plantations. Also many outside trials mentioned in previous years are still in progress.

Perhaps fortunately, all the diseases and pests of fruit trees do not occur on the Research Station, at least as sufficiently severe infestations to allow of life history and control studies. For this reason, our pathologists, entomologists and plant-protective chemists are the most frequent users of growers' plantations in their work. We are grateful to those growers who allow us to conduct such trials on their farms for the general good of the industry.

We cannot thank them all individually here and must confine ourselves to mentioning some of the fruitgrowers' troubles that are being tackled in this way.

Much of the work on hop diseases, including both Verticillium Wilt and virus diseases, is done on farms in Kent and Sussex and trials of concentrate spraying are being carried out jointly with the N.A.A.S. on growers' farms. We also have an observation plot for Bacterial Canker of cherries at West Malling. The Red Spider Mite Investigations in Essex could not go on without the co-operation of growers who have lent their orchards for mite control trials, and for studies of the life history and of the effects of acaricides, ovicides and fungicides on beneficial insects. Much of the work on strawberry aphid and strawberry eelworm has also been done in various parts of the country. In Essex, a trial for control of codling moth is in progress at Galleywood and work on the parasite aspect of this problem has been simplified by the loan of an orchard at Dunmow. Trials for the control of the Summer Fruit Tortricid have been initiated in Kent.

Outside Committees.

We have frequently spoken of the calls on the time of senior members of staff for service on outside committees. The Station is now represented by one or more members of staff on over sixty advisory and technical conferences and committees, as well as several bodies not so closely connected with our work. We have mentioned above the new central National Fruit Trials Station at Brogdale Farm, near Faversham. Mr. T. Neame has been appointed Chairman of the Station Advisory Committee and Dr. Tubbs Vice-Chairman. Several sub-committees for the new Station have been formed, of which both are members by virtue of their respective offices, and Mr. Hoblyn has been appointed also to the Technical Sub-Committee. We cannot but welcome this new opportunity to further the work of the new Station, the progress of which is so closely connected with our own and must be of concern to all who grow fruit.

We cannot detail individually all the other committees, etc., but record with pleasure that this year Dr. Harris is Vice-Chairman of the Association of Applied Biologists.

Scientific Societies and Conferences.

The event of the year has undoubtedly been the Thirteenth International Horticultural Congress held in London for the first time since 1930. Whilst the fruitgrowing section, of which Mr. R. J. Garner was Secretary, was perhaps of most interest to us, the Station and Bureau contributed also to a number of other sections, ten papers in all being given. As we were so near, many members of staff were able to attend some of the sessions ; while prominent horticulturists from all over the world were present and many

of them visited the Station, as detailed below. This has been the occasion of many new contacts and discussions, the influence of which on our work will be felt for years to come.

Drs. A. H. M. Kirby and M. H. Moore attended the Third International Congress of Crop Protection in Paris in September and Drs. W. A. Roach and F. H. Vanstone the International Conference on Soil Fertility in Dublin in July, each contributing one or more papers. Mr. A. C. Mason attended the International Congress on Analytical Chemistry in Oxford in September.

Dr. Vanstone read a paper on the flame spectrograph method at the Institute of Physics. Drs. A. E. Bradfield and A. E. Flood attended the special symposium on tannins at Long Ashton and contributed a paper on tannins and anthoxanthins of tea and fruit trees.

Papers were read at three meetings of the Association of Applied Biology in London, by Dr. W. G. Keyworth on systemic fungicides, by Mr. J. E. Crosse on the seasonal cycle of Bacterial Canker of cherry and by Dr. A. F. Posnette on progeny trials with cacao.

In connection with the wider responsibilities for N.A.A.S. horticultural experiments now accepted by the Station, Drs. Montgomery and Pearce attended a special conference of the Eastern Province N.A.A.S. staff, where they outlined the essentials of planning and running experiments on fruit on commercial holdings and discussed some of the many problems involved.

Members of staff attended many other meetings of learned societies and conferences of research workers, advisers and fruitgrowers, in many cases contributing substantially to the discussions.

Advisory Correspondence.

The records of advisory letters show that 2,041 were received during the year; this total is almost identical with that of last year. Individual research workers personally replied to some 520 of these enquiries, many of which came from specialist officers of the N.A.A.S. or had direct bearing on research in progress. The other 1,520 letters were dealt with by the Scientific Liaison Section, in collaboration, where appropriate, with the official advisory services.

Telephone enquiries continue to be as frequent as in recent years.

Advisory Visits.

The total of 91 advisory visits paid during the year was almost identical with the figure for last year (90), and again the majority, 63, concerned entomological matters.

Exhibits.

A special exhibit was prepared for the Chelsea Flower Show and it was shown again at the local Cobdown Show. This exhibit consisted of scale models of three recently excavated trees to show the arrangement of the root systems in relation to those of neighbouring trees; also, assistance was given to the N.A.A.S. at the National Produce Show at Reading, by erecting the complete tree and excavated root system of a Cox's Orange Pippin on M.II, to serve as a centre piece to their exhibit on the maintenance of soil fertility.

An exhibit on the Summer Fruit Tortricid was displayed at the Royal Entomological Society and the South London Entomological Society.

Visitors.

It was not possible to accept general visitors so freely as in recent years owing to other commitments, and as a result the total number of visitors recorded, 2,490, shows a substantial decrease on last year's total of 3,031. There were, however, more overseas visitors ; the number, 585, of whom 382 came as individuals with special requirements, doubtless was influenced by the International Horticultural Congress in London. While it is difficult to select from this list of visitors, we would like to mention the following: Professor H. B. Tukey, Dr. J. R. Magness, Dr. George Darrow and Dr. F. W. Went (U.S.A.), Dr. W. A. Ross, Dr. J. C. Wilcox, Dr. H. Hill and Dr. E. F. Palmer (Canada), Dr. R. H. Marloth and Dr. M.W. Black (S. Africa), Dr. T. Eden, (E. Africa), Dr. A. M.W. Greig (New Zealand), Dr. M. R. Samish (Israel), Professor S. J. Wellensiek and members of his staff at Wageningen (Holland), Dr. E. Loewel and Dr. E. Maurer (Germany), Dr. I. Granhall (Sweden), Professor N. Breveglieri (Italy), and Dr. D. Stankovic (Yugoslavia).

We were also honoured by a visit from Lord Carrington, Parliamentary Secretary to the Ministry of Agriculture.

Amongst the parties, we received the International Horticultural Congress, the Council of the Royal Agricultural Society, the Court of the Worshipful Company of Gardeners, the Quarantine Working Party of the European Plant Protection Organization, the Scottish Fruit Trials Committee, the Ministry of Agriculture Horticultural Society and various parties of students from Belgium, Sweden and U.S.A., as well as England.

A special visit was arranged for the nurserymen concerned with the large scale propagation of rootstocks, to acquaint them with the qualities of the new Malling-Merton apple rootstocks.

Dress rehearsals preceded two of the Members' Days and were well attended by advisory officers. The programmes for the other two Members' Days were linked with the fourth and fifth Amos Memorial lectures respectively and advisory officers were invited to attend. The regular annual visit of a third of the N.A.A.S. staff for a two-day refresher course provides a most valuable link in the dissemination of the results of our research. This year it was held in June and the subjects discussed included new rootstocks, soil management, root excavations, strawberry cultivation, pest and disease control and the design and conduct of field experiments. A feature of these visits is the informal question and answer period, in which it is possible to deal briefly with a wide variety of problems. In all, including various courses, some 300 horticultural officers visited the Station.

The Local Day was held on a Saturday in June this year and was attended by 140 people, some of whom came from places beyond our immediate neighbourhood, even outside Kent.

Attendance at Members' Days, which is not included in the above figures, amounted to 500.

Lectures and Demonstrations.

Thirty lectures, distributed widely throughout the Eastern and South Eastern counties, have been given to growers and students. In addition two members of staff acted as tutors in plant biology at the Westonbirt Summer School (London University) and another gave a course of lectures on entomology at the Essex Institute of Agriculture. A talk on the Summer Fruit Tortricid was given by Miss Joan Groves on the B.B.C.

Home Service in " Farming Today ". The frost damage research team collaborated with Mr. N. S. Macqueen in presenting a film on their work in " Science Review " on the B.B.C. Television.

The usual annual refresher courses on the recognition of fruit tree rootstocks and their virus diseases, and on hop diseases, were run for N.A.A.S. officers concerned with the certification of these crops.

Eight members of staff assisted in judging at the leading commercial and amateur fruit shows. In addition, two judged at the Young Farmers' Club competitions at the Kent Farm Institute.

Distribution of Experimental Material.

As forecast in last year's Report, 1951-52 was the last season, for the present, in which the standard varieties of Malling rootstocks will be available in quantity. Even so, with the exception of Crab C apple and F12/1 cherry, of which we have kept rather larger stoolbeds, the demand was for only a fraction of the supply. After lifting sufficient layers to meet the demand, the older beds in Ditton Fields were grubbed and there now remain only sufficient stoolbeds to meet the needs of research and education.

A new factor has now influenced nursery policy, however, in the confirmation that part of the stoolbeds of M.I and M.IX were infected with the virus disease causing Rubbery Wood in Lord Lambourne apple. The effect, if any, of this virus on other varieties is still practically unknown, but it was decided, nevertheless, to withdraw these two rootstocks from distribution. All the existing varieties of rootstocks are now being tested for virus content and a comprehensive programme for the isolation and building up of new virus-free clones of all rootstocks has commenced ; it will be several years, however, before this will lead to any considerable supply of virus-free rootstocks. Although this may not yet be recognized as a vital matter for commercial fruitgrowers, it is of the utmost importance to produce clean rootstocks for research purposes as soon as possible so as to eliminate a serious potential source of error in our experiments. Virus-free clones of rootstocks for other fruits are also being established.

During this winter, too, a first distribution was made of the new Woolly Aphid resistant apple rootstocks to research institutes in the British Commonwealth and the United States. Small quantities of each of some fourteen new selections were sent out for trial purposes only. In the following summer it was decided to commence the distribution on a larger scale, during 1952-53, of a few of the most promising selections to fruit tree nurserymen within the United Kingdom, to enable them to lay down stoolbeds and assist us to build up a sufficient supply for general use in the industry. The new selections from what is now called the Malling-Merton series are described in the Research Report for this year.

Rootstock raising is only part of the work of our nurseries and an extensive fruit tree nursery is necessary each year for research, though there are now only a few surplus trees to offer to our Members. Research required some 4,500 trees during 1951-52 and 11,000 strawberry runners were sent out for the formation of special stock nurseries. The demand from Members for the surplus, both of worked trees and small fruits, was very small.

Station's Publications.

Publications during the year are listed in Part II of the Research Report. The total of 77 consisted of 69 scientific papers and 8 popular articles. Assistance to the

N.A.A.S. in the preparation and revision of the official bulletins and leaflets replaces to some extent the writing of popular articles from the Station.

Journal of Horticultural Science.

The whole of Volume XXVII was published during the calendar year 1952 ; regular quarterly publication has now been achieved and there seems no reason why this should not be maintained in future. It is true that there has been a falling off in the number of papers submitted for publication during 1952 ; but this may have been at least partially advantageous, since it is enabling the Editors to reduce the number of papers awaiting publication and this will eventually shorten the waiting period, which is now well over a year.

Volume XXVII was necessarily smaller than its predecessor, containing 21 papers, 14 of which were from Long Ashton and East Malling. The new increased subscription rates come into force with Volume XXVIII ; these are dictated by the high cost of production and should, with continued economy, enable the Journal to be published without loss. A grant from the Royal Society, however, has been made to permit the publication of a rather larger number of papers during 1953 ; this will both help to reduce the waiting list and result in a rather larger Volume in the coming year.

Library Committee.

During 1951-52 the use made of the library and the services provided continued at approximately the same level as in the previous year. A slight increase was recorded in the number of items borrowed which totalled 3,121. In addition 580 current periodical parts were circulated on the automatic system to the Sections interested, and 273 loans and 66 photocopies were obtained from other libraries. Conversely, we lent 394 publications to other libraries and institutes.

Twenty-nine books were purchased for the Station library, as well as 151 volumes of bound journals, 1,314 pamphlets and, as usual, numerous periodical parts and annual reports.

While lack of space prevents individual citation of all the many gifts to the library during the year, special mention may perhaps be made of the interesting " Book of the Royal Horticultural Society ", 1863, presented by Miss M. E. Bunyard. To her and other members of staff who have presented copies of their papers and theses, and to all other individuals and institutes who have made gifts of literature, the library is very grateful.

HEADLEY BROTHERS LTD
109 Kingsway London WC2
and Ashford Kent